Connecticut Mastery Test 2nd Generation Objectives (In effect through the fall of 1999)

GRADE 4 OBJECTIVES — SECOND GENERATION

Concepts	Objective
4.1	Extend or complete patterns involving whole numbers and attributes.
4.2	Identify alternative forms of expressing whole numbers using expanded notation.
4.3	Identify alternative forms of expressing whole numbers using regrouping.
4.4	Identify and label fractional parts of regions and sets using pictures.
4.5	Relate multiplication and division facts to rectangular arrays and pictures.

Number Facts and Computation	Objective
4.6	Add and subtract facts to 18.
4.7	Add and subtract 1- and 2-digit numbers without regrouping.
4.8	Add 1- and 2-digit numbers with regrouping.
4.9	Multiply and divide by 2, 5, and 10.

Problem Solving/ Applications	Objective
4.10	Solve problems involving order and magnitude of whole numbers.
4.11	Solve problems involving place value concepts such as 1 more/less, 10 more/less.
4.12	Solve problems involving rounding 2-digit whole numbers.
4.13	Solve problems involving estimates of sums and differences, including money amounts.
4.14	Identify objects or numbers that are the same or different by one attribute or that do or don't belong in a matrix or array.
4.15	Identify correct information from graphs, tables, and charts.
4.16	Draw reasonable conclusions from graphs, tables, and charts.
4.17	Create bar graphs or pictographs from data.
4.18	Write story problems from number sentences.

Problem Solving/ Applications (cont.)	Objective
4.19	Identify the appropriate operation (addition or subtraction) to solve story problems.
4.20	Solve simple story problems involving addition or subtraction.
4.21	Solve simple story problems involving addition or subtraction with extraneous information.
4.22	Solve problems involving time, elapsed time, and calendars.
4.23	Identify needed information in problem situations.
4.24	Solve problems involving elementary notions of probability.

Measurement/ Geometry	Objective
4.25	Measure lengths and draw lines to the nearest inch and nearest centimeter.
4.26	Identify appropriate customary or metric measures for a given situation.
4.27	Estimate lengths and areas.
4.28	Tell time to the nearest hour, half hour, and quarter hour using analog and digital clocks.
4.29	Determine the value of a set of coins.
4.30	Identify or draw geometric shapes and figures including angles and sides of polygons.

GRADE 6 OBJECTIVES — SECOND GENERATION

Concepts (w/o calculator)	Objective
6.1	Extend patterns involving numbers and attributes and state rules for given patterns.
6.2	Identify alternative forms of expressing whole numbers less than 10,000 using expanded notation.
6.3	Identify alternative forms of expressing whole numbers less than 10,000 using regrouping.
6.4	Relate fractions and mixed numbers to pictures and vice versa.
6.5	Rename equivalent fractions.
6.6	Relate equivalent mixed numbers and improper fractions.
6.7	Relate decimals (.01–2.99) to pictorial representations.
6.8	Estimate the magnitude of mixed numbers and decimals.
6.9	Locate points on number lines, scales, and grids.

Facts and Computation (w/o calculator)	Objective
6.10	Add and subtract 2-, 3- and 4-digit whole numbers and money amounts less than $100.00.
6.11	Multiply and divide multiples of 10 and 100 by 10 and 100.
6.12	Multiply and divide facts.
6.13	Multiply and divide 2- and 3-digit whole numbers and money amounts less than $10.00 by 1-digit numbers.
6.14	Add and subtract fractions and mixed numbers with like denominators.
6.15	Identify an appropriate procedure for making estimates involving whole-number computation.
6.16	Identify an appropriate procedure for making estimates involving sums or differences of mixed numbers and decimals (tenths).

Problem Solving/ Applications (with calculator available)	Objective
6.17	Solve problems involving order and magnitude of whole numbers less than 100,000.

Problem Solving/ Applications (cont.)	Objective
6.18	Solve problems involving rounding whole numbers.
6.19	Draw reasonable conclusions from graphs, tables, and charts.
6.20	Create graphs from data.
6.21	Identify the appropriate operation to solve story problems.
6.22	Solve l-step problems involving whole numbers and money amounts.
6.23	Solve 2-step problems involving whole numbers and money amounts.
6.24*	Estimate a reasonable answer to 1- and 2-step problems involving whole numbers and money amounts.
6.25	Solve or estimate a reasonable answer to problems involving making change.
6.26*	Estimate a reasonable answer to problems involving fractions.
6.27	Identify needed information in problem situations.
6.28	Solve problems involving elementary notions of probability and fairness.
6.29	Solve process problems involving the organization of data.
6.30	Solve problems involving elapsed time.
6.31	Solve problems involving the conversion of measures of length and time.

Measurement/ Geometry (with calculator available)	Objective
6.32	Identify, draw, describe and classify geometric shapes and figures.
6.33	Measure/determine perimeter and areas.
6.34	Estimate lengths and areas.
6.35	Identify appropriate metric or customary units of measure for a given situation.
6.36	Identify or draw lines of symmetry.

*Without a calculator available

GRADE 8 OBJECTIVES — SECOND GENERATION

Concepts (w/o calculator)	Objective
8.1	Identify or extend patterns involving numbers and attributes.
8.2	Relate fractions, decimals, and percents to their pictorial representations.
8.3	Rename fractions and mixed numbers as equivalent decimals and vice versa.
8.4	Rename fractions and decimals as equivalent percents and vice versa.
8.5	Identify points on number lines, scales, and grids including fractions, decimals, and integers.
8.6	Estimate the magnitude of mixed numbers and decimals.

Computation and Estimation (w/o calculator)	Objective
8.7	Add and subtract 2-, 3- and 4-digit whole numbers, money amounts and decimals.
8.8	Multiply and divide 2- and 3-digit whole numbers, money amounts and decimals by 1-digit whole numbers and decimals.
8.9	Multiply and divide whole numbers and decimals by 10, 100, and 1000.
8.10	Add and subtract fractions and mixed numbers with reasonable and appropriate denominators.
8.11	Multiply whole numbers and fractions by fractions and mixed numbers.
8.12	Find percents of whole numbers.
8.13	Identify an appropriate procedure for making estimates involving whole-number computation.
8.14	Identify an appropriate procedure for making estimates involving fraction and mixed-number computation.
8.15	Identify an appropriate procedure for making estimates involving decimal computation.
8.16	Identify an appropriate procedure for making estimates involving percents.

Problem Solving/ Applications (with calculator available)	Objective
8.17	Solve problems involving order and magnitude of fractions.
8.18	Solve problems involving order and magnitude of whole numbers and decimals.
8.19	Solve problems involving rounding whole numbers and decimals.
8.20	Draw reasonable conclusions from graphs, tables, and charts.
8.21	Create graphs from data.
8.22	Identify an appropriate number sentence to solve story problems.
8.23	Solve or estimate a reasonable answer to problems involving whole numbers, dollar amounts, including averaging.
8.24	Solve or estimate a reasonable answer to problems involving fractions, decimals, and mixed numbers.
8.25	Solve or estimate a reasonable answer to problems involving ratios, proportions, and percents.
8.26	Solve or estimate a reasonable answer to problems involving customary or metric units of measure.
8.27	Solve or estimate a reasonable answer to problems involving elementary notions of probability and fairness.
8.28	Solve or estimate a reasonable answer to problems involving means and medians of sets of data.
8.29	Identify needed information in problem situations.
8.30	Solve process problems involving the organization of data.

Measurement/ Geometry (with calculator available)	Objective
8.31	Identify or draw geometric shapes and figures.
8.32	Identify or draw geometric transformations and symmetry.
8.33	Describe, model, and classify shapes.
8.34	Measure and determine perimeters, areas, and volumes.
8.35	Estimate lengths, areas, volumes, and angle measures.
8.36	Identify appropriate metric or customary units of measure for a given situation.

Algebra (with calculator available)	Objective
8.37	Solve equations involving one step.
8.38	Use order of operations.
8.39	Use formulas to evaluate expressions.
8.40	Represent situations with algebraic expressions.

Connecticut Mastery Test 3rd Generation Blueprint (Goes into effect in the fall of 2000)

Connecticut Mastery Test
3rd Generation Blueprint

Grades 4, 6 and 8 Content Map

Content Standard	Strand
Number Sense	Place Value Pictorial Representations of #'s Equivalent Fractions, Decimals and Percents Order, Magnitude and Rounding
Operations	Models for Operations Mastery of Basic Facts Computes with Whole Numbers and Decimals Computes with Fractions Solves Word Problems
Estimation and Approximation	Numerical Estimation Strategies Estimate Solutions to Problems
Ratios, Proportions and Percents	Ratio and Proportions Computes with Percents
Measurement	Time Customary and Metric Measures Approximate/Estimate Customary and Metric Measures
Spatial Relationships and Geometry	Geometric Shapes and Properties Spatial Relationships
Probability and Statistics	Tables, Graphs and Charts Statistics and Data Analysis Probability
Patterns	Patterns
Algebra and Functions	Algebraic Concepts
Discrete Mathematics	Classification and Logical Reasoning
Integrated Understandings	Mathematical Applications

Connecticut Mastery Test
3rd Generation Blueprint

Grade 4

Content Standard	Strand	Concept or Skill
Number Sense	**Place Value**	1a. Solve problems involving 1 and 10 more or less 1b. Identify alternative forms of expressing whole numbers using expanded notation 1c. Identify alternative forms of expressing whole numbers using regrouping 1d. Use place value concepts to interpret the meaning of numbers
	Pictorial Representations of #'s	2a. Relate pictorial representations using base ten blocks to whole numbers and vice versa 2b. Identify and label fractional parts of regions and sets using pictures
	Equivalent Fractions, Decimals and Percents	Not tested at grade 4
	Order, Magnitude and Rounding	4a. Order whole numbers 4b. Describe magnitude of whole numbers 4c. Round whole numbers in context 4d. Identify points representing whole numbers on a number line and vice versa
Operations	**Models for Operations**	5a. Relate multiplication and division facts to rectangular arrays and pictures 5b. Identify or write the appropriate operation or number sentence to solve story problems 5c. Write story problems from number sentences
	Mastery of BasicFacts	6a. Add and subtract facts to 18 6b. Multiply and divide by 2, 5 and 10

	Computes with Whole Numbers and Decimals	7a. Add and subtract 1- and 2-digit numbers without regrouping 7b. Add 1- and 2-digit numbers with regrouping
	Computes with Fractions	Not tested at grade 4
	Solves Word Problems	9a. Solve simple story problems involving addition or subtraction 9b. Solve simple story problems involving addition or subtraction with extraneous information
Estimation and Approximation	**Numerical Estimation Strategies**	10a. Identify the best expression to find an estimate 10b. Identify whether and why a particular strategy will result in an overestimate or an underestimate
	Estimate Solutions to Problems	11a. Identify a reasonable estimate to a problem
Ratios, Proportions and Percents	**Ratio and Proportions**	Not tested at grade 4
	Computes with Percents	Not tested at grade 4
Measurement	**Time**	14a. Tell time to the nearest hour, half hour, and quarter hour using analog and digital clocks 14b. Solve problems involving time, elapsed time, and calendars
	Customary and Metric Measures	15a. Measure or draw lengths to the nearest inch and centimeter 15b. Identify appropriate customary or metric measure for a given situation
	Approximate/Estimate Customary and Metric Measures	16. Estimate lengths and areas
Spatial Relationships and Geometry	**Geometric Shapes and Properties**	17. Identify or draw geometric shapes and figures including angles and sides of polygons
	Spatial Relationships	Not tested at grade 4

Probability and Statistics	**Tables, Graphs and Charts**	19a. Identify correct information form graphs, tables and charts 19b. Create bar graphs and pictographs from data
	Statistics and Data Analysis	20. Draw reasonable conclusions from graphs, tables and charts
	Probability	21. Solve problems involving elementary notions of probability
Patterns	**Patterns**	22a. Extend or complete patterns involving whole numbers and attributes and state rules for given patterns 22b. Complete patterns in a matrix
Algebra and Functions	**Algebraic Concepts**	Not tested at grade 4
Discrete Mathematics	**Classification and Logical Reasoning**	24. Identify objects that are the same or different by one attribute
Integrated Understandings	**Mathematical Applications**	25. Solve extended numerical and statistical problems

Connecticut Mastery Test
3rd Generation Blueprint

Grade 6

Content Standard	Strand	Concept or Skill
Number Sense	**Place Value**	1a. Solve problems involving 100 and 1000 more or less
		1b. Identify alternative forms of expressing whole numbers < 10,000 using expanded notation
		1c. Identify alternative forms of expressing whole numbers < 10,000 using regrouping
		1d. Use place value concepts to interpret the meaning of numbers
	Pictorial Representations of #'s	2a. Relate decimals (0.01 - 2.99) to pictorial representations
		2b. Relate fractions and mixed #'s to pictures and vice versa
	Equivalent Fractions, Decimals and Percents	3a. Rename equivalent fractions
		3b. Rename equivalent mixed #'s and improper fractions
	Order, Magnitude and Rounding	4a. Order whole numbers less than 100,000 in context
		4b. Order fractions, mixed numbers, and decimals in context
		4c. Describe magnitude of whole numbers < 100,000
		4d. Describe magnitude of fractions, mixed numbers and decimals
		4e. Round whole numbers in context
		4f. Round decimals in context
		4g. Locate points on number lines and scales
Operations	**Models for Operations**	5a. Identify the appropriate operation or number sentence to solve story problems
		5b. Write story problems from multiplication and division number sentences
	Mastery of BasicFacts	6. Multiply and divide facts

	Computes with Whole Numbers and Decimals	7a. Add and subtract 2-, 3- and 4-digit whole numbers and money amounts less than $100.00 7b. Multiply and divide multiples of 10 and 100 by 10 and 100 7c. Multiply and divide 2- and 3-digit whole numbers and money amounts less than $10 by 1-digit numbers
	Computes with Fractions	8. Add and subtract fractions and mixed numbers with like denominators
	Solves Word Problems	9a. Solve 1-step problems involving whole numbers and money amounts 9b. Solve 2-step problems involving whole numbers and money amounts
Estimation and Approximation	**Numerical Estimation Strategies**	10a. Identify the best expression to find an estimate 10b. Explain why an estimate is or is not reasonable 10c. Identify whether and why a particular strategy will result in an overestimate or an underestimate
	Estimate Solutions to Problems	11a. Identify a reasonable estimate to a problem 11b. Make a reasonable estimate for the solution to a problem and explain the process used to arrive at the estimate
Ratios, Proportions and Percents	**Ratio and Proportions** **Computes with Percents**	Not tested at grade 6 Not tested at grade 6
Measurement	**Time**	14a. Solve problems involving elapsed time 14b. Solve problems involving the conversion of measures of time
	Customary and Metric Measures	15a. Solve problems involving the conversion of measures of

		length 15b. Measure lengths to the metric or customary unit specified 15c. Measure/determine perimeter and area 15d. Identify appropriate customary or metric measure for a given situation
	Approximate/Estimate Customary and Metric Measures	16. Estimate lengths and areas
Spatial Relationships and Geometry	**Geometric Shapes and Properties**	17. Identify, draw, describe and classify geometric shapes and figures
	Spatial Relationships	18a. Identify or draw lines of symmetry 18b. Identify congruent figure 18c. Locate points on grids
Probability and Statistics	**Tables, Graphs and Charts**	19. Create graphs from data
	Statistics and Data Analysis	20. Draw reasonable conclusions from graphs, tables and charts
	Probability	21a. Solve problems involving elementary notions of fairness 21b. Solve problems involving elementary notions of probability
Patterns	**Patterns**	22a. Identify or extend patterns involving numbers and attributes and state rules for given patterns 22b. Complete patterns in a matrix
Algebra and Functions	**Algebraic Concepts**	23. Solve simple 1-step equations
Discrete Mathematics	**Classification and Logical Reasoning**	24. Solve problems involving the organization of data
Integrated Understandings	**Mathematical Applications**	25. Solve extended numerical, spatial statistical problems

Connecticut Mastery Test
3rd Generation Blueprint

Grade 8

Content Standard	Strand	Concept or Skill
Number Sense	**Place Value**	1a. Solve problems involving 0.1 and 0.01 more or less 1b. Identify alternative forms of expressing numbers using expanded notation 1c. Identify alternative forms of expressing numbers using scientific notation
	Pictorial Representations of #'s	2a. Relate fractions, decimals and percents to their pictorial representations
	Equivalent Fractions, Decimals and Percents	3a. Rename equivalent fractions and mixed #'s as equivalent decimals and vice versa 3b. Rename fractions and decimals as equivalent percents and vice versa
	Order, Magnitude and Rounding	4a. Order whole numbers or decimals in context 4b. Order fractions and mixed #'s in context 4c. Describe magnitude of whole numbers and decimals 4d. Describe magnitude of fractions and mixed numbers 4e. Round whole numbers, fraction and decimals incontext 4f. Identify points on number lines and scales, including fractions, decimals, and integers
Operations	**Models for Operations**	5a. Identify the appropriate operation or number sentence to solve story problems 5b. Write story problems from equations
	Mastery of Basic Facts	Not tested a grade 8

	Computes with Whole Numbers and Decimals	7a. Add and subtract 2-, 3- and 4-digit whole numbers and decimals 7b. Multiply and divide whole numbers and decimals by 10, 100 and 1000 7c. Multiply and divide 2- and 3-digit whole numbers and money amounts and decimals by 1-digit numbers and decimals
	Computes with Fractions	8a. Add and subtract fractions and mixed numbers with reasonable and appropriate denominators 8b. Multiply whole numbers and fractions by fractions and mixed numbers
	Solves Word Problems	9a. Solve 1-step problems involving whole numbers, decimals and money amounts 9b. Solve 1-step problems involving fractions and mixed numbers 9c. Solve multi-step problems involving whole numbers, decimals, fractions, and mixed numbers, including averaging 9d. Solve problems involving whole numbers, decimals, fractions, and mixed numbers with extraneous information
Estimation and Approximation	**Numerical Estimation Strategies**	10a. Identify the best expression to find an estimate 10b. Explain why an estimate is or is not reasonable 10c. Identify whether and why a particular strategy will result in an overestimate or an underestimate
	Estimate Solutions to Problems	11a. Identify a reasonable estimate to a problem 11b. Make a reasonable estimate for the solution to a problem and explain the process used to arrive at the estimate
Ratios,	**Ratio and Proportions**	12a. Solve problems involving ratios

Proportions and Percents		12b. Solve problems involving proportions
	Computes with Percents	13a. Find percents of whole numbers or the percent a given number is of another number 13b. Solve problems involving percent
Measurement	**Time**	14a. Solve problems involving conversion of time units 14b. Solve problems involving interpretations of time
	Customary and Metric Measures	15a. Solve problems involving customary or metric units of measure 15b. Measure/determine perimeter area, and volume 15c. Identify appropriate customary or metric measure for a given situation
	Approximate/Estimate Customary and Metric Measures	16. Estimate lengths, areas, volumes, and angle measure
Spatial Relationships and Geometry	**Geometric Shapes and Properties**	17a. Identify or draw geometric shapes and figures 17b. Describe, model and classify shapes
	Spatial Relationships	18a. Identify or draw geometric transformations 18b. Identify or draw lines of symmetry 18c. Relate 2-dimensional and 3-dimensional representations 18b. Identify congruent figure 18e. Identify points on grids
Probability and Statistics	**Tables, Graphs and Charts**	19. Create graphs from data
	Statistics and Data Analysis	20a. Draw reasonable conclusions from graphs, tables and charts 20b. Solve problems involving means and medians of sets of data 20c. Describe data with respect to shape and range

	Probability	21a. Solve problems involving elementary notions of fairness 21b. Solve problems involving elementary notions of probability 21c. Solve problems involving expected outcomes or prediction
Patterns	**Patterns**	22a. Identify or extend patterns involving numbers and attributes and state rules for given patterns 22b. Complete patterns in a matrix
Algebra and Functions	**Algebraic Concepts**	23a. Solve simple 1-step equations 23b. Use order of operations 23c. Use formulas to evaluate expressions 23d. Represent situations with algebraic expressions
Discrete Mathematics	**Classification and Logical Reasoning**	24. Solve problems involving the organization of data
Integrated Understandings	**Mathematical Applications**	25. Solve extended numerical, spatial statistical problems

Connecticut Academic Performance Test Mathematics Specifications

CAPT Mathematics Framework

The CAPT design and framework for the assessment of Mathematics was developed by an advisory committee of Connecticut educators and is based on current research and theory about mathematics instruction and assessment. The CAPT mathematics framework that is presented on pages 4 and 5 integrates the skills, competencies and understandings delineated in *Connecticut's Common Core of Learning* (1987) with the vision described in the National Council of Teachers of Mathematics' *Curriculum and Evaluation Standards for School Mathematics* (1989).

Accordingly, the test assumes the acquisition of basic knowledge and skills and requires the application of that knowledge and those skills to the solution of realistic problems drawn from everyday experiences and the needs of the workplace. Using "real-world" scenarios, followed by clusters of either open-ended or constructed-response "grid-in" items, the CAPT assesses the mathematics that 10th grade students are expected to know and be able to do.

The CAPT Mathematics Test is based on the view that mathematical understanding is best assessed by doing mathematics, and that doing mathematics means using and discovering knowledge in the course of solving genuine problems.

This means that, instead of assessing long division skills directly, students apply division skills and might be asked to find the price per pound of 2.83 pounds of ground beef that has a total cost of $6.20, compare this price with the unit prices of other possible choices, and finally, justify their purchase decision. Students may use any type of calculator with which they are familiar and comfortable. The calculator can either be provided by the school or brought from home.

Similarly, rather than factor trinomial expressions (a skill that is not part of the CAPT framework), students may be asked to sketch a distance vs. time graph and a speed vs. time graph that represent a single circuit of a pictured roller-coaster ride, thereby applying critical algebraic understandings.

Thus the CAPT mathematics test assesses knowledge, skills and applications reasonable to expect of all students by the end of 10th grade.

Following is a description of the mathematical processes and the mathematical content areas that constitute the CAPT mathematics framework upon which the test has been constructed.

CAPT Mathematics Processes

A. Problem Solving and Reasoning

- Formulate problems from situations and given data
- Develop and apply a variety of strategies to solve problems—particularly multi-step and nonroutine problems
- Make and evaluate conjectures and arguments
- Verify, validate and interpret results and claims and generalize solutions

B. Communicating

- Model situations using written, concrete, pictorial, graphical and algebraic representations
- Express mathematical ideas and arguments with clarity and coherence
- Use mathematical language and notation to represent ideas, describe relationships and model situations

C. Computing and Estimating

- Compute accurately and make estimates with whole numbers, fractions, decimals, percents, integers, and rational numbers
- Select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil or calculator
- Use estimation to assess the reasonableness of results

CAPT Mathematics Content Areas

A. Number and Quantity

- Understand, represent and use numbers in a variety of forms (integer, fraction, decimal, percent, exponential, scientific notation) in real-world and mathematical problem situations
- Demonstrate an understanding of order, magnitude and equivalent forms with whole numbers, fractions, decimals, percents, integers, and rational numbers
- Use arithmetic operations and understand how the operations are related to one another
- Understand and apply ratios and proportions

B. Geometry, Measurement and Shape

- Represent and solve problems using geometric models
- Interpret and draw 2- and 3-dimensional objects
- Understand and use the concepts of rotation, reflection and translation to demonstrate geometric figures and apply relationships of congruence and similarity
- Deduce and use properties of, and relationships between, figures from given assumptions
- Use coordinate representations of geometric figures
- Estimate, make and use measurements to describe and compare phenomena
- Select and use appropriate units and tools to measure, including conversions between units within measurement systems
- Understand and use the concepts of perimeter, area, volume, angle measure, capacity, weight and mass
- Develop and use rates and other derived and indirect measures
- Understand and apply the relationship between precision of measurements and accuracy of calculations.

C. Statistics, Probability and Data

- Systematically collect, organize and describe data
- Construct, read and interpret tables, charts and graphs of data from real-world situations
- Draw and defend inferences from charts, tables and data
- Understand sampling and recognize its role in statistical claims
- Understand and use basic probability to make predictions and to evaluate the likelihood of events

D. Relations, Functions and Algebra

- Understand and use the concepts of a variable, expression and equation
- Represent and analyze situations involving variable quantities with tables, graphs, verbal rules and equations; understand the interrelationship among these representations
- Describe, analyze, extend and create a wide variety of patterns
- Understand and use direct and inverse variation
- Use tables and graphs to solve problems
- Create and use equations and inequalities including formulas to model situations and solve problems
- Analyze and use functional relationships to explain how a change in one quantity results in a change in another